We Claim:

1. Lens with at least one aspheric lens surface, wherein, on describing the aspheric lens surface by means of Zernike polynomials, the following holds for the aspheric lens surface:

$$P(h) = \frac{h^2}{R\left(1+\sqrt{1-\frac{h^2}{R^2}}\right)} + K0 + K4 * Z4 + K9 * Z9 + K10 * Z16 + K25 * Z25$$

$$+ K36 * Z\,36 + K49 * Z49 + K64 * Z64$$

with

Z4 = (2 x h2 -1)

Z9 = (6h4 – 6h2 + 1)

Z16 = (20h6 – 30h4 + 23h2 – 1)

Z25 = (70h8 – 140h6 + 90h4 – 20 h2 +1)

Z36 = (252h10 – 630h8 + 560h6 – 210h 4 + 30 h2 – 1)

Z49 = (924h12 – 27.72h 10 + h3150h8 – 1680h6 + h420h4 – 42h2 + 1)

Z64 = (3432h14 – 12012h12 + 16632h110 – h11550h8 + 4200h6 – 756h4 + 56h2 – 1)

where P is the sagitta as a function of the normed radial distance h from the optical axis 7:

$$h = \frac{\text{distance from the optical axis}}{\text{½ (lens diameter of the aspheric)}} = \text{normed radius}$$

$$0 < h \leq 1$$

and wherein at least two of the following conditions is fulfilled:

(a) $\left| \frac{K16}{K9} \right| < 0.7$

(b) $\left| \frac{K25}{K9} \right| < 0.1$

(c) $\left| \frac{K36}{K9} \right| < 0.02$

the radius of the aspheric lens surface being fixed so that K4 = 0.

2. Lens with at least one aspheric lens surface according to claim 1, wherein

for (a), $\left| \frac{K16}{K9} \right| < 0.6$,

and/or for (b), $\left| \frac{K25}{K9} \right| < 0.07$,

and/or for (c), $\left| \frac{K36}{K9} \right| < 0.015$.

3. Lens according to claim 1, where in the aspheric lens surface fulfills all three conditions (a) through (c).

4. Lens, particularly for microlithography, with at least one aspheric lens surface, wherein the aspheric lens surface is described by:

$$P(h) = \frac{h^2}{R\left(1+\sqrt{1-\frac{h^2}{R^2}}\right)} + \text{K0} + \text{K4} * \text{Z4} + \text{K9} * \text{Z9} + \text{K10} * \text{Z16} + \text{K25} * \text{Z25}$$

$$+ \text{K36} * \text{Z 36} + \text{K49} * \text{Z49} + \text{K64} * \text{Z64}$$

with

Z4 = (2 x h2 -1)

Z9 = (6h4 – 6h2 + 1)

Z16 = (20h6 – 30h4 + 23h2 – 1)

Z25 = (70h8 – 140h6 + 90h4 – 20 h2 +1)

Z36 = (252h10 – 630h8 + 560h6 – 210h 4 + 30 h2 – 1)

Z49 = (924h12 – 27.72h 10 + h3150h8 – 1680h6 + h420h4 – 42h2 + 1)

Z64 = (3432h14 – 12012h12 + 16632h110 – h11550h8 + 4200h6 – 756h4 +

56h2 – 1)

where P is the sagitta as a function of the normed radial distance h from the optical axis 7:

$$h = \frac{\text{distance from the optical axis}}{\text{½ (lens diameter of the aspheric)}} = \text{normed radius}$$

$0 < h \leq 1$

and the resulting components, when using the normed radius, do not exceed the following values:

(a) K9 * Z9 ≤ 300 µm, and/or

(b) K16 * Z16 ≤ 10 µm, and/or

(c) K25 * Z25 ≤ 2 µm, and/or

(d) Kc * Zc ≤ 1 µm for all c > 35.

5. Lens according to claim 1, wherein the aspheric lens surface (AS1) is provided on a convex lens surface.

6. Objective, wherein the objective includes at least one lens according to claim1.

7. Projection objective comprising at least a first and a second region, wherein at least one lens with an aspheric lens surface according to claim 1 is arranged in the lens groups up to and including the second convexity.

8. Objective according to claim 7, wherein a lens surface (S2) is arranged adjacent to the aspheric lens surface (AS1) and has a radius different by less than 30% from the radius of the aspheric lens surface (AS1).

9. Objective according to claim 7, where in the objective is a microlithography objective.

10. Projection exposure device for microlithography, wherein it contains a projection objective according to claim 7.

11. Method of producing microstructured components, in which a substrate provided with a photosensitive layer is exposed by means of a mask and a projection exposure device with a lens arrangement which contains at least one lens with an aspheric lens surface according to claim 1.

12. Method of generating new objective designs, wherein for all aspheric lens surfaces provided in the design, the lens surfaces are according to claim 1.

13. Compensation optics for testing aspheric lenses, said optics containing at least three lenses, having a test diameter between 120 mm and 350 mm, and being isoplanatically corrected, wherein the imaging scale in testing varies by less than 3%, preferably 1% , between the aspheric surface and a planar or curved spherical reference surface.